

## A PACKAGE WITH PILFER PROOF ASSEMBLY

### CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** This application claims priority to co-pending U.S. Provisional application 60/528,043, filed on December 8, 2003. The entire disclosure of that prior filed application is hereby incorporated by reference.

### FIELD OF THE INVENTION

**[0002]** The present invention relates generally to the field of product packaging, and in particular to product containers having an internal locking mechanism and pilfer proof assembly.

### BACKGROUND OF THE INVENTION

**[0003]** Product packaging serves a number of important functions, including: protecting the packaged product from damage, attractively displaying the packaged product, preventing theft or tampering, and providing the purchasing consumer easy post-purchase access. In addition, it is desirable for a package to be as inexpensive as possible to manufacture.

### SUMMARY OF THE INVENTION

**[0004]** The present invention fulfills the needs identified above by providing packaging comprising a product container for protecting the product from damage and attractively displaying the product, retained within an outer sleeve to prevent theft or tampering. The present invention includes an interior product container having a mating surface on the exterior of the product container and an outer sleeve having a corresponding opposing mating surface on the interior of the outer sleeve for locking the outer sleeve in position around the product container to prevent theft or tampering.

**[0005]** In exemplary embodiments, the mating surfaces include panels, tabs, ribs, catches, abutments, edges, cutouts, apertures, and like elements, integral to or attached to either a card or tray, configured to connect with similar complimentary elements associated with an outer sleeve, and referred to herein as the mating surfaces.

**[0006]** An embodiment of the present invention comprises a tray with an engaging tab and a sleeve with a tray receiving area. At least one pre-formed tray, configured with a receiving cavity to receive and hold at least one portable item, may be locked into the tray receiving area. An outer sleeve configured to receive the tray into a tray receiving area has disposed along it a locking edge configured to engage a tab at a locking position. A tray may be fully or partially inserted within the void defined by the outer sleeve.

**[0007]** Another embodiment comprises a tray with a recess to receive a locking tab and a sleeve with a locking tab. This tray has disposed along an edge an indentation to receive a locking tab. The outer sleeve defines a void configured to receive the tray, and has a locking tab to engage the indentation in the tray.

**[0008]** Other embodiments of the present invention include improved components, such as a monolithically fabricated tray. Here, a tray may be fabricated from any forming technique or process known to those skilled in the art, including but not limited to thermoforming, vacuum forming, and injection molding. The tray comprises at least one recessed cavity configured to receive and hold a product. The tray may also be formed by two hinged halves to fully enclose the product.

**[0009]** In practice, the embodiments of the present invention are configured to resist access to an item by securing the item in a locking package. A method for resisting access to an item secured in an embodiment of the present invention comprises the following steps, presented in the following order for the purposes of teaching and not limitation. Provide a tray container with a means for engagement. Provide an outer sleeve with open ends to form an accessible void, and opposing mating surfaces to interlockingly secure the tray. Align the tray with the open end and orientate the corresponding opposing mating surfaces. Insert the card fully into the void to cause the corresponding opposing mating surfaces to couple or connect. The tray may also have depressions that may be folded and oriented to fill the end of the void and prevent access to the product.

[0010] Embodiments according to this invention offer at least the following advantages: lightness in weight, resistance to tampering, excellent durability, ease of assembly, product protection, ease of storage, ease of disposal, the ability to present devices of different and unusual shapes, and excellent economy.

[0011] It is also contemplated that the present invention is not limited to specific goods, but is applicable to a plethora of goods. Other advantages of the present invention will be apparent from the following description, the accompanying drawings, and the appended claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 shows a perspective view of a product package according to an aspect of the invention.

[0013] FIGS. 2 and 3 show front and rear views of the package shown in FIG. 1.

[0014] FIGS. 4 and 5 show left and right side views, respectively, of the package shown in FIG. 1.

[0015] FIGS. 6 and 7 show top and bottom views, respectively, of the package shown in FIG. 1.

[0016] FIG. 8 shows a plan view of a blank for fabricating a sleeve according to an aspect of the invention.

[0017] FIG. 9 shows a plan view of the blank shown in FIG. 8, partially assembled into a sleeve.

[0018] FIG. 10 shows a plan view of the blank shown in FIG. 8, fully assembled into a sleeve.

[0019] FIG. 11 shows an end view of the sleeve shown in FIG. 10.

[0020] FIG. 12 shows a plan view of a blank for fabricating an internal tray according to an aspect of the invention.

[0021] FIG. 13 shows a perspective view of an internal tray, according to an aspect of the invention.

[0022] FIG. 14 shows a perspective view of an alternative internal tray, according to an aspect of the invention.

[0023] FIG. 15 shows a perspective view of an internal tray, according to an aspect of the invention.

[0024] FIG. 16 shows a plan view of a blank for fabricating an internal tray according to an aspect of the invention.

[0025] FIG. 17 shows a plan view of a blank for fabricating a sleeve according to an aspect of the invention.

[0026] FIG. 18 shows a plan view of a blank for fabricating a sleeve according to an aspect of the invention.

[0027] FIG. 19 shows a shows a perspective view of an open internal product container, according to an aspect of the invention.

[0028] FIG. 20 shows a perspective view of a closed internal product container, according to an aspect of the invention.

[0029] FIG. 21 shows a perspective view of the method of assembly of the internal tray within the sleeve of one embodiment of the invention.

#### DETAILED DESCRIPTION

[0030] As required, detailed embodiments of the present invention are disclosed herein. It will be understood that the disclosed embodiments are merely exemplary of the invention that may be embodied in various and alternative forms. The figures are not necessarily to scale, and some features may be exaggerated or minimized to show details of particular components. In other instances, well-known materials or methods have not been described in detail in order to avoid obscuring the present invention. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but as a

basis for the claims and for teaching one skilled in the art to variously employ the present invention.

[0031] Generally speaking, FIG. 1 shows a perspective view of an exemplary product package 10 according to the present invention. The package 10 includes a tri-fold sleeve 12 having an upper opening at an upper end and lower opening at a distal end. The package 10 also includes a monolithic internal tray 14, which, as assembled and illustrated, comprises a combination of formed depressions 16a-c and a product receiving cavity 18. Generally describing the assembled product package from the point of view of FIG. 1, the upper opening is partially-blocked by a first formed depression 16a, the product (not shown) rests in the receiving cavity 18, and the lower opening is substantially-blocked by a combined second depression 16b and third depression 16c matingly folded to form a rigid base.

[0032] Further and as will be described in detail, the sleeve 12 includes a locking tab, best shown in FIG. 8, and the tray 14 includes a locking tab receiving channel, best shown in FIGS. 12 and 13. Alternatively, and best shown in FIG. 17, the sleeve includes a locking tab receiving channel and, as shown in FIGS. 15 and 16, the tray includes a locking tab. Returning to FIG. 1, when assembled, the locking tab and receiving channel matingly engage to prevent the fully inserted tray 14 from being removed from the sleeve 12. In practice, with the product resting in the receiving cavity 18 of the assembled product package, the product is inaccessible without permanently destroying the sleeve 12 or tray 14.

[0033] In other words, in practice the product is attractively displayed but is inaccessible from the upper partially-blocked opening because of the opposing configuration of depression 16a and receiving cavity 18, and is inaccessible from the lower substantially-blocked opening because of the matingly folded depressions 16b and 16c. For the benefit of the purchasing consumer a perforated line 20, substantially the height of the sleeve 12, is provided so that after purchasing the packaged product 10 the consumer may easily open the package and access the product.

[0034] In the illustrated embodiment, the package 10 cannot be resealed after the perforation 20 is breached. Accordingly, the breached perforation stands as evidence of tampering or theft of the product. It is contemplated that the package may be designed to be opened and refastened, with or without breaching a perforation. Those skilled in the art will

appreciate that a means for opening the sleeve 12 may be provided for the purpose of accessing the product, together with a means for closing the sleeve 12. By way of illustration and not limitation, the sleeve 12 may be opened or refastened with locking tabs, tape, Velcro®, string, buttons, bands, or other well-known approaches for opening and refastening lapped flaps.

**[0035]** As further shown in FIG. 1, the receiving cavity 18 is shaped to receive a product to be held in the package 10. For the reasons presented below, it will be appreciated that receiving cavity 18 may be fully modified to accommodate any shaped product. In addition, the depressions 16a-c as illustrated are half-oval shaped. It will likewise be appreciated that depressions 16a-c may be freely modified to accommodate any shape that prevents unauthorized access to the product from the upper or lower ends.

**[0036]** FIGS. 2-7 show additional views of the package 10 shown in FIG. 1. FIGS. 2 and 3, respectively, illustrate the front and rear views of the package 10. In FIG. 2, depression 16a is viewed from its concave side while receiving cavity 18 is viewed from its convex side. In FIG. 3, the opposite hand is shown. FIGS. 4 and 5 show left and ride side views of the package 10, and better illustrate the concave/convex orientations of depression 16a and cavity 18. FIG. 6 shows the partially-blocked upper opening formed by depression 16a, while FIG. 7 shows the substantially-blocked lower base formed by mated depressions 16b-c.

**[0037]** The operation of the locking mechanism and pilfer proof assembly will now be described with respect to several exemplary embodiments and an exemplary fabrication technique, and it will be apparent that the described container and fabrication technique may be modified without departing from the spirit of the invention. FIG. 8 shows a plan view of a blank 100 for forming a sleeve 12 according to one embodiment of the invention. FIG. 17 shows a plan view of a blank 340 for forming a sleeve 12 according to another embodiment of the invention. The thickness of the sheet is selected based on a number of factors, including price and strength. The sheet should be thick enough to provide structural support, but thin enough to allow the sheet to be flexed and folded, as described herein.

**[0038]** The blank 100, 340 is die cut from a sheet of suitable material, such as PVC, APET, or PETG. By way of example and not limitation, the illustrated blank 100, 340 is 0.025"

thick PVC. Other materials including paperboard may be used if desired, and textual or graphic matter may be printed directly onto the blank using a high-speed printing process.

[0039] With regard to choice of materials, the blank 100, 340 may comprise paper, paperboard, cardboard, plastic, or combinations thereof. Where the blank 100, 340 comprises paperboard, bleached sulphate, solid unbleached sulphate, or clay-coated newsback are well-known design choices. Typically the paperboard coating is a fluid blend of materials, such as coating clay, calcium carbonate, and/or titanium dioxide with starch or adhesive smoothly applied to the traveling surface. Successive densification and polishing finish the mineral-coated surface to a superior, graphic-print surface. When the blank and/or tray is paper, fabrication techniques well known to those skilled in the art, including vacuum forming, are contemplated. When the blank and/or tray is plastic, fabrication techniques well known to those skilled in the art, including thermo-forming, injection molding, and the like, are contemplated.

[0040] Returning now to FIGS. 8 and 17, a series of score lines 102, 341 is fabricated into the blank 100, 340 to divide the blank into a number of panels and tabs. In addition, a perforated line 103, 342 is added in order for the purchasing consumer to access the product. The blank 100, 340 includes a first panel 104, 343, a second panel 106, 344, and a third panel 108, 345, which are folded and lapped to form the finished sleeve 12. An attachment edge 110, 346 is defined by the outside edge of the third panel 108, 345, opposite the outside edge of the first panel 104, 343.

[0041] Continuing to refer to FIGS. 8 and 17, extending from the outside edge of the first panel 104 is a single non-releasable locking tab 112. According to one aspect of the invention, the locking tab 112 is rectangular in shape. The locking tab 112 includes a first locking edge 114 and a second locking edge 116 that, as described below, engage a receiving channel 118, best illustrated in FIGS. 12 and 13, and described further below. Alternatively, as shown in FIG. 17, a tab section 350 extends outward from the first panel 343. Disposed between tab section 350 and the first panel, midway along the length of the sleeve, is a cutout 347 to function as a locking tab receiving channel. The cutout 347 is open to receive a locking tab 326, shown in FIGS. 15 and 16, and the cutout has edges 348 and 349.

[0042] In fabricating a finished sleeve 12 from the blank 100, the locking tab 112 is folded inward toward the interior of first panel 104. Alternatively, in fabricating a finished sleeve

from blank 330, the tab section 350 is folded inward toward the interior of the first panel 343, creating locking tab receiving channel 347 from the cutout. First panel 104, 343 is then folded over second panel 106, 344. The partially folded blank 100 is shown in FIG. 9. Third panel 108, 345 is then folded over first panel 104, 343. A suitable technique is employed to affix the attachment edge 110, 346 to the first panel 104, 343 along the cross-hatch regions 122. By way of illustration and not limitation, the cross-hatch regions 122 may be affixed by chemical, thermal, or mechanical bonding methods well known to those skilled in the art.

**[0043]** As best illustrated in FIGS. 10 and 11, it will be seen that the bonding of the attachment edge 110, 346 to the first panel 104, 343 creates a sleeve 12 with openings at the left and right of the blank 100, 340. As shown in FIG. 11, locking tab 112 is captured between first panel 104 and second panel 106. Alternatively, the folded tab section 350 folded against the first panel 343 will create a locking tab receiving channel 347 between the first panel 343 and second panel 344. The void 124 created by the folded panels 104, 344, 106, 344, and 108, 345 will be filled by internal tray 14, 325, as described in detail further below.

**[0044]** FIGS. 12 and 13 illustrate an exemplary embodiment of the internal tray 14. FIGS. 15 and 16 illustrate another exemplary embodiment of the internal tray 325. In a preferred embodiment the internal tray 14, 325 is a plastic thermoformed tray. More specifically, the tray includes a receiving cavity 18, 328, upper depression 16a, 327a, lower depressions 16b-c, 327b-c, and locking tab receiving channel 118. Alternatively, and best shown in FIGS. 15 and 16, the tray may include a locking tab 326 in place of a locking tab receiving channel 118. As with the sleeve blank 100, 330, the tray 14, 325 may be made of any suitable material.

**[0045]** With regard to an exemplary method of manufacturing, the tray 14, 325 may begin as a blank 200, 330, best illustrated in FIGS. 12 and 16, used in a thermoform moulding process. A score line 102, 332 is provided, and a length along one edge of the blank is removed to form a locking tab receiving channel 118. Alternatively, one edge of the blank may be cut in at least one location along its length to form a locking tab 326. In a preferred embodiment, the locking tab receiving channel 118, 347 is no longer in length than is necessary to securely engage locking tab 112, 326. Receiving channel 118 includes a first locking edge 202 and a second locking edge 204. In practice, the locking edges 114, 116 of the locking tab 112 matingly engage the locking edges 202, 204 of the tray 14 when the tray 14 is fully inserted into the receiving void 124 of the sleeve 12. Alternatively, in practice locking edges 336, 334 of

locking tab 325 on the tray 325 matingly engage locking edges 348, 349 of locking tab receiving channel 347 within the sleeve 340 when the tray 325 is fully inserted into the receiving void 124 of the sleeve 340.

[0046] The blank 200, 330 is of sufficient size to receive the product to be packaged, represented here by the shape 206, 338. It will be appreciated by those skilled in the art that the receiving cavity 18, 328, best shown in FIGS. 13 and 15, can be of any shape conceivable. Accordingly, shape 206, 328 is shown here is for purposes of illustration and not limitation.

[0047] The thermoform moulding process creates, in the exemplary tray 14, 326, a receiving cavity 18, 328 and depressions 16a-c, 327a-c. Although only one receiving cavity 18, 328 is shown, it is contemplated that multiple receiving cavities may be provided. In addition, although only one depression 16a, 327a is shown at one end, it is contemplated that two depressions may be provided at this end, thereby creating a substantially-blocked end on both sides of the assembled product package 10.

[0048] Alternative exemplary embodiments of both the sleeve 12 and tray 14, 325 are contemplated. For example, with regard to the sleeve 12, rather than utilizing a tri-fold blank 100, 340 it is contemplated to use a bi-fold blank to form a pillow'd sleeve with internal lock. Conceptually, and in practice, the bi-fold blank is identical to the tri-fold blank 100, 340 except the bi-fold blank does not include the second panel 106, 344. Otherwise, the bi-fold blank is folded and attached in the same manner as described above, including the locking tab 112, or locking tab receiving channel 347, and perforated line 103, 342.

[0049] With regard to an alternative exemplary embodiment of the tray 14, reference is now made to FIG. 14. Here the tray 300 includes a fully encapsulating receiving cavity formed by mating cavity depressions 304 and 306, mating upper depressions 310 and 312, mating lower depressions 314 and 316, mating receiving channels 318 and 320, and score lines 322. When folded along score line 322, a fully encapsulating receiving cavity is formed that performs according to inventive concepts described herein.

[0050] The assembly of the product package 10 will now be described. With reference to FIG. 11, depending on the size of the finished sleeve 12, it would be possible for a worker to hold the sleeve 12 in one hand, using the thumb and fingers to apply pressure to the side edges 130. The worker can then pop the sleeve 12 open, expanding the receiving void

124 sufficiently to insert the internal tray 14. As described above in reference to the first embodiment illustrated by FIG. 8, first panel 104 includes locking tab 112. As best illustrated by FIG. 11, after the panels are folded the locking tab 112 extends inwardly to engage the receiving channel 118. In the alternative embodiment illustrated by FIG. 17, first panel 343 includes receiving channel 347 exposed inwardly to receive the locking tab 326.

[0051] In the foregoing exemplary embodiments, the end of the tray 14, 325 which comprises depression 16a, 327a is the leading end inserted into the receiving void 124. If an alternative embodiment includes two depressions 16a-a', 327a-a' identical to 16b-c, 327b-c, then depression 16a', 327a' is folded along a score line such that the depressions 16a-a', 327a-a' form a three-dimensional top identical to the base best shown in FIG. 1, before inserting the tray into the receiving void 124.

[0052] However, before inserting the internal tray 14, the worker would look and confirm the tray 14 is oriented so that the receiving channel 118, 347 is aligned with the locking tab 112, 326. When fully inserted, the receiving channel 118, 347 engages the locking tab 112, 326 so both must be aligned to matingly engage. Prior to fully inserting the tray 14 into the sleeve 12, the product is loaded into the receiving cavity 18. Depression 16c, 327c is folded along the score line 102 provided, such that depressions 16b, 327b, and 16c, 327c form the three-dimensional base best illustrated in FIG. 1.

[0053] Because of the resilience of the material used to fabricate the sleeve 12 and locking tab 112, the locking tab has a tendency to fold and unfold slightly. The slight folding of the tab 112 is beneficial as the tray passes by the tab 112, pushing the tab 112 back against the first panel 104 or second panel 106. The slight unfolding of the tab 112 is beneficial in ensuring a firm locking mechanism – when receiving channel 118 is immediately adjacent to the tab 112, the tab 112 springs back from the panel 104, 106 to fill the void that is the receiving channel 118. It will be clear to one skilled in the art that after the locking tab 326 is folded inwardly to allow the tray 325 to be inserted into the sleeve 12, the resilience of the locking tab 326 causes the locking tab 326 to unfold slightly when it comes into contact with the receiving channel 347, thereby likewise ensuring a firm locking mechanism between said locking tab 326 and said receiving channel 347.

[0054] Completing the assembly of product package 10, as shown in FIG. 20, the base formed by 16b-c is fully inserted into the sleeve 12. Substantially simultaneous with the full insertion of the tray 14, 325 into the sleeve 12, locking tab 112, 326 springs from its compressed position to matingly engage receiving channel 118, 347. When engaged and as illustrated, the tab's first locking edge 336 abuts the locking tab receiving channel's first locking edge 348 while the tab's second locking edge 334 abuts the locking tab receiving channel's second locking edge 349. With the respective locking edges 336, 348; 114, 202 and 334, 349; 116, 204 abutting each other, the tray 14 and sleeve are fully engaged. It is contemplated, and easily understood, that because of the versatility of the present invention, when fully inserted and engaged the locking edges 114, 202; 116, 204; 336, 349; 334, 348; 114, 204 and 116, 202 may abut to create the internal locking mechanism. The above described manual operations may also be performed by machine.

[0055] It will be understood that while the exemplary embodiment illustrates a single locking tab 112 and a single receiving channel 118, multiple locking tabs 112 and receiving channels 118 are contemplated, the number and arrangement being merely a design choice.

[0056] The exemplary product package configuration of FIGS. 1-13 is oval shaped. It is contemplated that the present invention is well suited for all package shapes including square, rectangular, circular, sextagonal, octagonal, and variations thereof. The product package configuration is merely a design choice in response to the type and number of products contained in the one or more receiving cavities.

[0057] The depressions 16a-c, 327a-c are hollow as illustrated, but as one skilled in the art will understand, ribs may be provided within the depression or enclosure to improve the structural integrity or related performance characteristics of the product package 10. In addition, one or more depressions 16a-c, 327a-c may be formed on the blank 100, 340 rather than the blank 200, 330.

[0058] A further alternative exemplary embodiment of the invention is best shown in FIGS. 18-20. A blank 400, best shown by FIG. 18, is used to create an asymmetrically shaped sleeve 12. As described in the above embodiments, the sleeve will be constructed from a thermoformed blank 400, or other flexible or resilient material. Blank 400 includes scored lines 401 and first panel 402, second panel 403, and third panel 404. Blank 400 will fold along 401

so that first panel 403 and second panel 404 will form the front and back of the sleeve. One side 405 joining 403 and 404 will be formed by the scored fold lines 401. A second side 406 will be formed by the folds between first panel 403 and adhesive panel 402. The sleeve will be fully closed by folding adhesive panel 402 onto the edge of second panel 404. A perforation 407 along the length of the blank 400 will allow the consumer access to the product. Protruding cavities 408 may be included to allow the consumer to view the product inside. Indentations 409 will be cut into blank 400 and will be disposed in sides 405, 406 to engage a locking mechanism.

**[0059]** A clamshell product container 455 is best shown in FIG. 19. As described in the above embodiments, the container will be constructed from a thermoformed blank. A number of recessed cavities 450 will be disposed along the blank to fully enclose the product being packaged. As will be understood by one skilled in the art, there may be any number of cavities 450 comprised of any shape required to enclose the product. One side 451 would function as the front of the container as another side 452 would function as the rear of the container. The container may be hinged 453 along its top edge. When folded along the hinge 453, side one 451 and side two 452 will close with the cavities 450 aligned to fully enclose the product. The resulting product container 455 will be narrow at the top hinge 453 but thicker toward the bottom to form a trapezoidal shape. Extending from side 451 and side 452 are two protruding tabs 454. When folded along the hinge 453, the protruding tabs 454 along side one and the protruding tabs 454 along side two will align to form the portion of the locking mechanism on the product container. The two sides will be closed together by adhesive or other means known by those skilled in the art as indicated in the above embodiments. The protruding tabs 454 may be flexible or rigid, however, if the sleeve is rigid, then the protruding tabs 454 of the product container must be a resilient material to be folded inwardly and then released to matingly engage the indentations 409 in the sleeve 12 during the assembly of the final package.

**[0060]** Once assembly is accomplished, the final package will be best shown by FIG. 20. The sleeve 12 will be shaped so as to slide over the product container 455 to a certain point where it may not progress further due to the thickness at the bottom of the container 455. The locking mechanism is engaged if the sleeve is flexible as the sleeve 12 moves over the protruding tabs 454 until they are matingly engaged with the notches 409 cut into the sides 405,

406 of the sleeve 12. At that point, the flexible sleeve is expanded by the increased thickness of the lower part of the product container so that it cannot be flexed to slide the flexible sleeve back over the protruding tabs 454. Alternatively if the sleeve 12 is rigid or if the product container is not of increasing thickness, the protruding tabs 454 should be resilient and should be folded inwardly to allow the sleeve to pass over them until they are matingly engaged with the notches 409 cut into the sides 405, 406 of the sleeve 12, and the protruding tabs 454 spring back into a protruding position in the notches 409. Once the notches 409 are matingly engaged with the protruding tabs 454, the only access to the product will be through the perforation 407 along the length of the sleeve 12.

[0061] It should be emphasized that the above-described embodiments of the present invention, particularly, any "preferred" embodiments, are merely possible examples of implementations, merely set forth for a clear understanding of the principles of the invention. Many variations and modifications may be made to the above-described embodiment(s) of the invention without departing substantially from the spirit and principles of the invention. Further, it will be understood that variations, modifications, and enhancements can be made to the disclosed apparatus and methods without departing from the scope of the present invention as defined in the following claims. All such modifications and variations are intended to be included herein within the scope of this disclosure and the present invention and protected by the following claims.